

VT-6 HOW TO HANDLE AN EMERGENCY SITUATION

Be prepared! The first step in preparation is to know the NATOPS. This means knowing not only the emergency section, but also learning the operating limitations, flight characteristics, and systems operations.

You need to be able to recite the **critical action or asterisk (*) items verbatim**. N/W/C do not need to be memorized verbatim, however, you do need to be able to talk about all of them and explain them from memory. Additionally, knowing the N/W/C help you to understand why you're doing steps of the EP. **If you don't know your Emergency Procedures, you will not be taken to fly.**

The second step in preparation is to challenge yourself. Start with simple EPs and then become more inventive. Take each EP through its logical conclusion, such as a Compressor Stall → Eng Failure → Immediate Airstart → PEL/Forced Landing. As you can see, one emergency could logically take you to five different procedures. Ask yourself, what would make the situation worse? For example, after a hydraulic malfunction that requires the emergency gear extension, how does your situation change if there isn't enough pressure to lower the flaps? What if you blow a tire trying to stop on the runway? Figure out how you can use your growing knowledge to derive an acceptable solution. As you progress through your training, you will notice there is more than one way to solve problems. Whether you are chair flying, briefing an IP, or executing a simulated or actual EP in the aircraft, always think not just about quoting the steps verbatim, but rather how you will actually execute them in real life or in the training scenario you find yourself in. Don't be afraid to use some headwork and decision making skills!

Once you know the basics of preparing for an EP, how do you put this knowledge and practice to work? Per NATOPS, when an airborne emergency occurs, three basic rules apply:

Maintain aircraft control. This means 1) do not hit anything (i.e. other aircraft, the ground, or obstacles), and 2) do not stall or go OCF. The quickest way to fail an EP (or put yourself in a dangerous situation during an actual EP) is to not fly the aircraft or to lose situational awareness on where you are going. The T-6B is a single engine aircraft, and any engine malfunction must be treated conservatively until further troubleshooting indicates a different course of action. At the first sign of **engine trouble**, a good technique is to immediately Turn / Climb / Clean / Check in accordance with the PEL procedure. This is only an initial reaction and should take 4-5 seconds as your primary focus should be on quickly analyzing the situation.

Analyze the situation. This means spend the requisite time to put the correct EP name to the indications that you see. A thorough understanding of aircraft systems will aid in troubleshooting and choosing the appropriate corrective action. For an engine malfunction, as you are beginning your Turn / Climb / Clean / Check, you will simultaneously be analyzing the situation to determine if you should continue with the PEL, execute the Engine Failure During Flight procedure, or another procedure. Always fully analyze the situation before you take actions other than maintaining aircraft control. **No fast hands in the cockpit!** Doing the wrong steps due to improper analysis can make a bad situation much worse.

Take appropriate action.

Once you have analyzed the situation and confirmed your indications, execute the appropriate critical action items if required. These must be memorized verbatim from NATOPS; however, rote memorization is not enough. You must thoroughly understand how to apply critical action items (e.g. 'zoom/glide – 125kts min' or 'Intercept ELP'), and whether or not notes/warnings/cautions apply. The pilot not flying should back up the pilot flying with the pocket checklist, reviewing the critical action items and non-critical action items along with the applicable notes, warnings, and cautions. Never assume you have a problem solved. After taking what you think is the correct action always double check everything to ensure you have achieved the correct result.

If solo, use the iPad combined checklist or open up the PCL when, and if, time permits or have someone else back you up on critical action items and non-critical action items via radio. Both dual and solo aircraft have many other resources to assist in the event of an emergency or other malfunction. Potential assistance could come from other aircraft in the area, OLF RDOs, squadron FDOs, or ATC.

Note: DO NOT SHUT DOWN THE ENGINE during a SIMULATED engine failure. *SNAs have done this in the past, particularly after returning to the flight line from the simulator where the PCL was actually moved to off.* Do not move any switches or pull any levers during simulated EPs without first confirming with the instructor.

Land as soon as conditions permit.

“Land as soon as practical” means due to the nature of the emergency, extended flight is not recommended. The duration of the flight and landing site is at the discretion of the pilot in command.

“Land as soon as possible” means to land at the first place at which a safe landing can be made. You need to get the plane on the ground right now (smoke and fumes); perform this in the quickest and safest manner possible. The break typically allows for the quickest recovery and it is the recovery with which you are most familiar. Depending on the nature of the emergency, a straight in recovery may be required.

“PEL – EXECUTE” when you think your engine might quit or need to be shut down (CHIP, FUEL PRESS, unconfirmed fire)

Fly a straight in approach when the controllability of the aircraft is in question.

Declaring an Emergency

Students often neglect to declare an emergency. Base your status on the priority you need from the controller and the type of response you want from agencies such as the fire department or flight surgeon. An emergency will get you top priority from any controller and all applicable base agencies. Adding your emergency status to all radio calls will ensure you are not forgotten. If you have a power or controllability problem, or any condition that may lead to a fire or injury, declare an emergency. Weather is a factor that may cause you to upgrade a situation to an emergency in order to gain priority from the controlling agency. You will not be faulted for making a conservative decision to declare an emergency or perform an emergency ground egress.

Other considerations as you decide what type of landing to execute and what to do afterwards:

- Landing distance. Is the nearest runway long enough for your situation?
- Crash support, and Flight Surgeon availability. Will you have appropriate agency support at your current destination?
- Ejection considerations. Is it possible/likely you could abandon the airplane in a residential area? Is it feasible to alter your route of flight for such a consideration?
- Will you be taxiing clear or stopping straight-ahead and shutting the runway down? Will you egress normally, or emergency ground egress?

How to handle an In-Flight Emergency

1. Maintain aircraft control:

- Maneuver into and/or maintain attitude that allows the pilot to respond to the emergency situation.
- **IF CURRENT ENGINE PERFORMANCE IS QUESTIONABLE** (can't maintain altitude and airspeed), make an immediate **TURN** towards the nearest suitable landing runway and transition to your best glide speed by initiating a **CLIMB** to decelerate towards 125 KIAS (or descent if already 125 KIAS or less). Get the aircraft **CLEAN**, gear and flaps up (if able).
- **IF FUTURE ENGINE PERFORMANCE IS IN DOUBT**, make an immediate **TURN**, to the nearest suitable landing runway while using appropriate power to establish a **CLIMB** (if additional altitude is not required, set 4-6% torque and transition to best glide speed of 125 KIAS). Get the aircraft **CLEAN**, gear and flaps up.
- **IF ENGINE PERFORMANCE IS NOT THE PROBLEM**, establish and maintain controlled flight in appropriate direction, airspeed, and configuration.

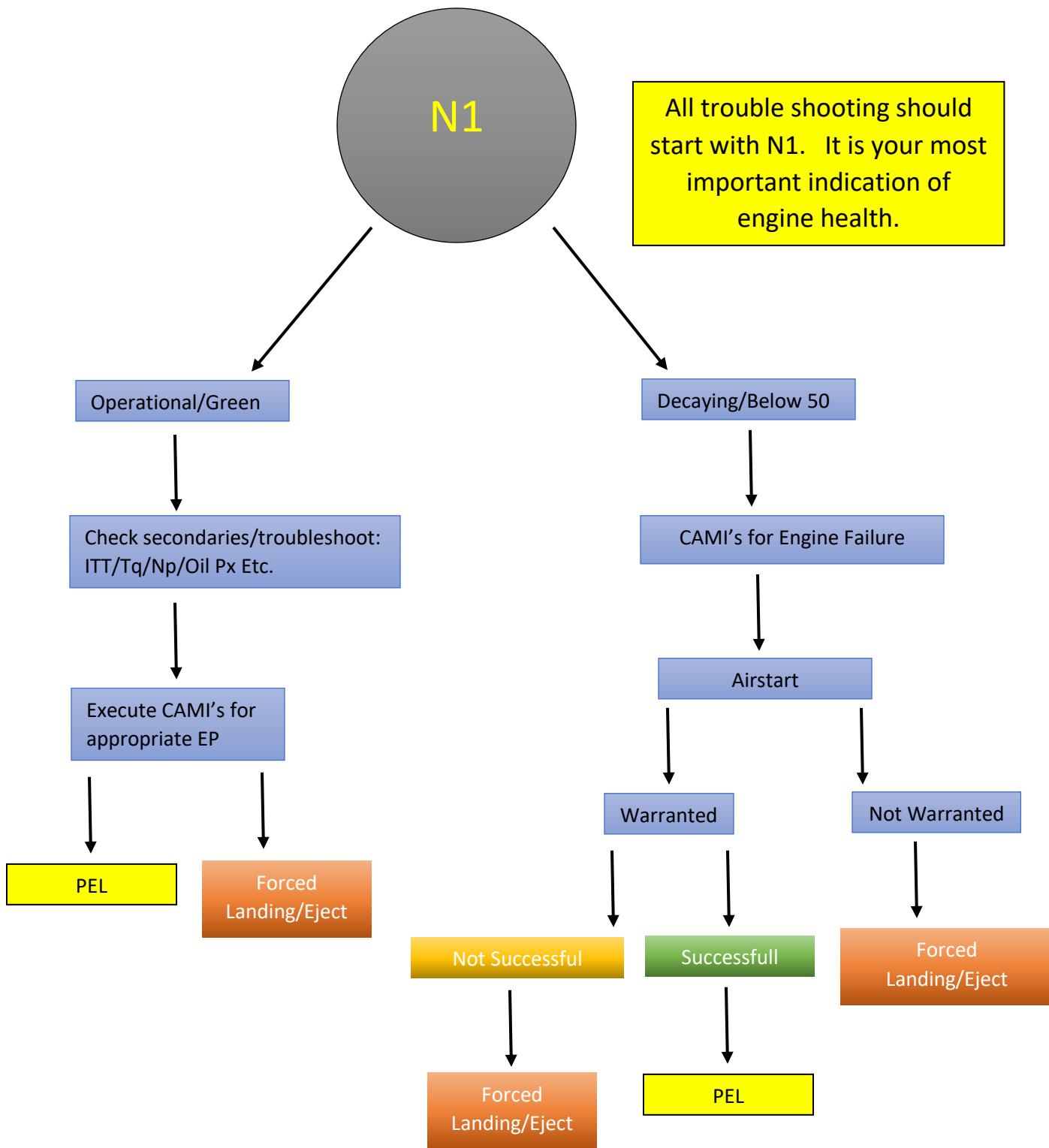
2. Analyze the situation and take proper action:

- Check and analyze indications
 - Aircraft performance
 - Warning and Indicator Lights and EICAS display
 - Other cockpit indications (visuals, noise, etc.)
- Determine the appropriate emergency procedure. You can't apply correct procedure if you don't know the problem!!!!
- Execute the appropriate emergency procedure (Begin at step 1)

3. Land as soon as conditions permit:

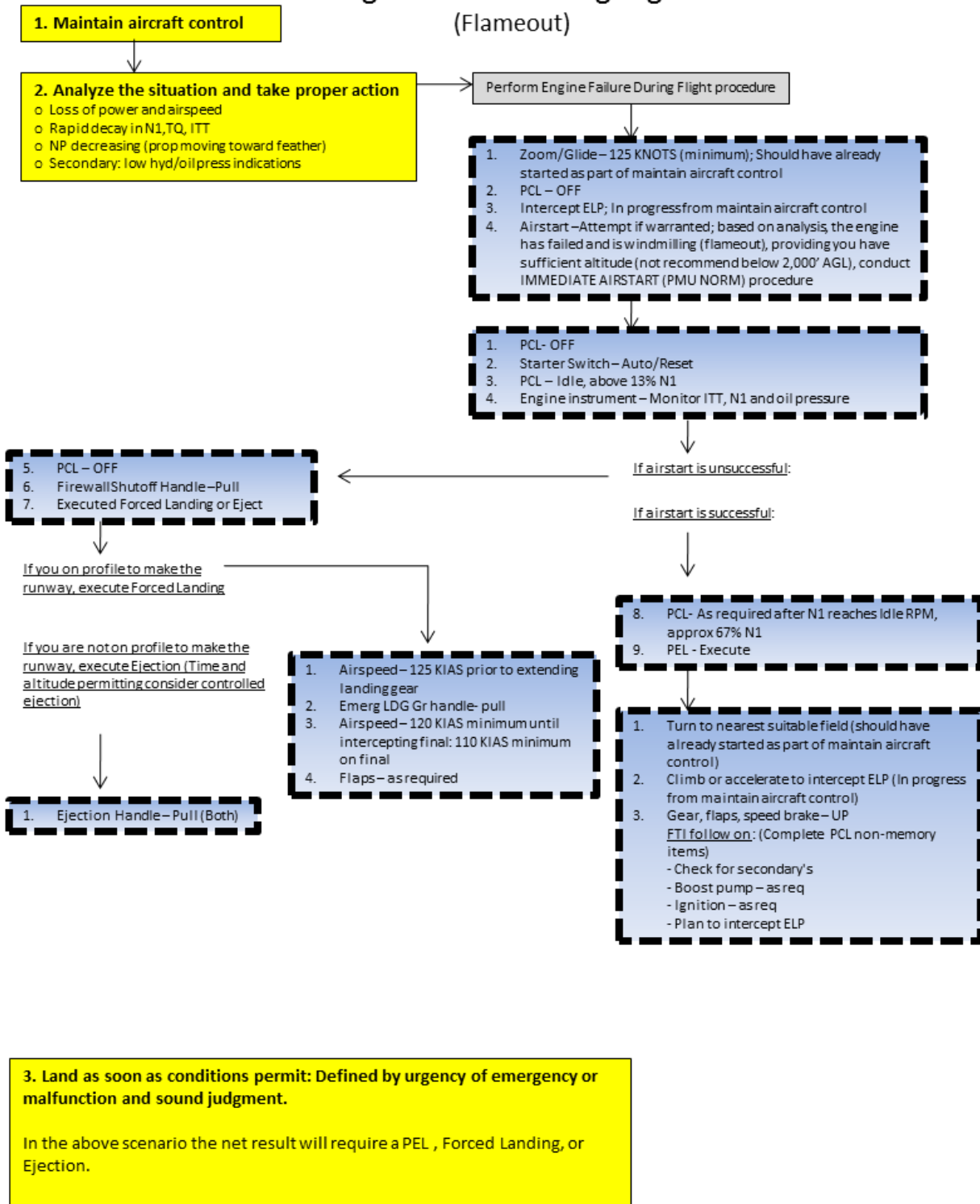
- Defined by the urgency of emergency or malfunction and sound judgement
- Usually will end in one the following:
 - PEL
 - Forced Landing
 - Ejection
 - Land as soon as possible
 - Land as soon as practical

Generic EP Trouble Shooting Tree:

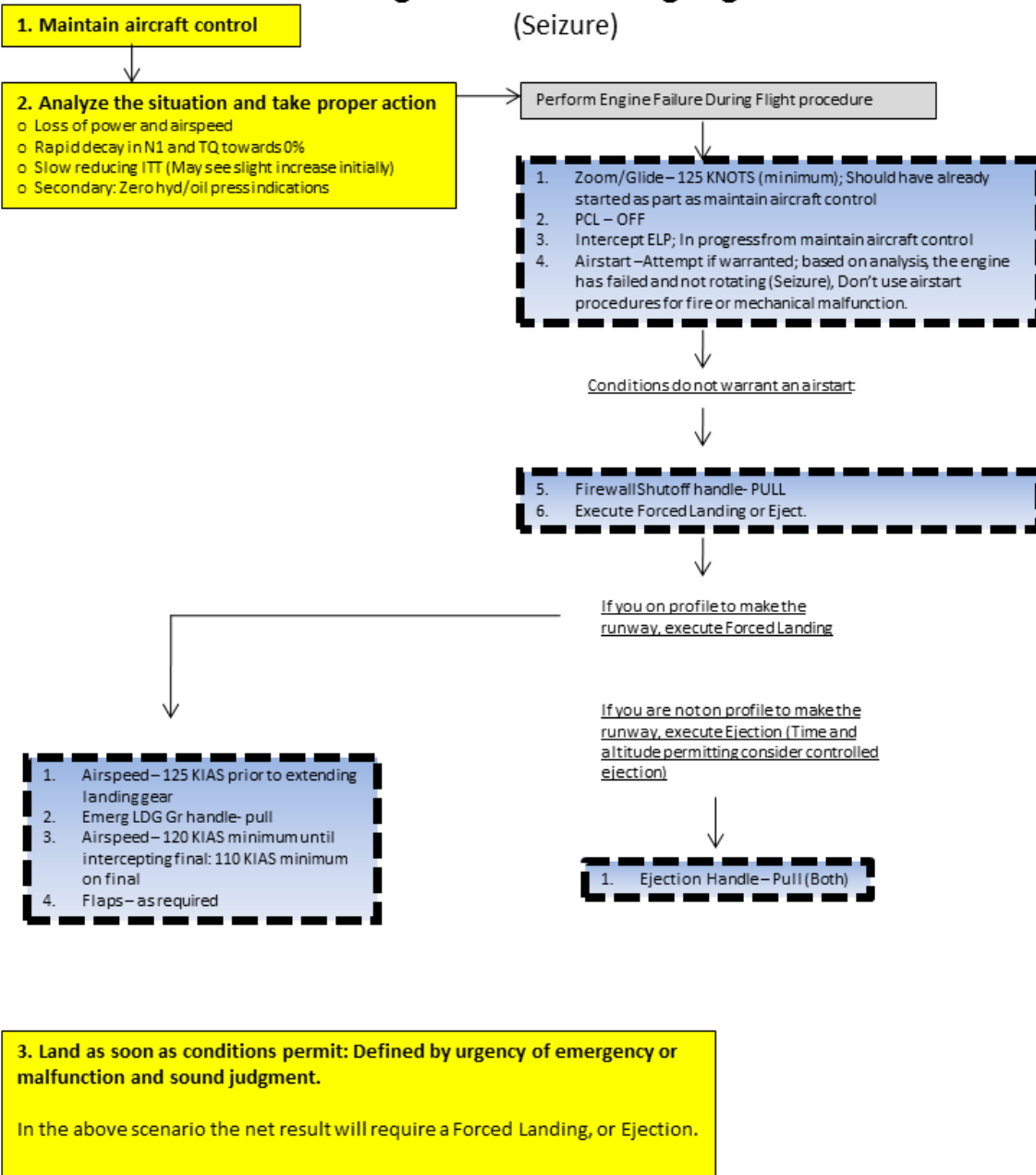


Specific EP trouble Shooting Trees:

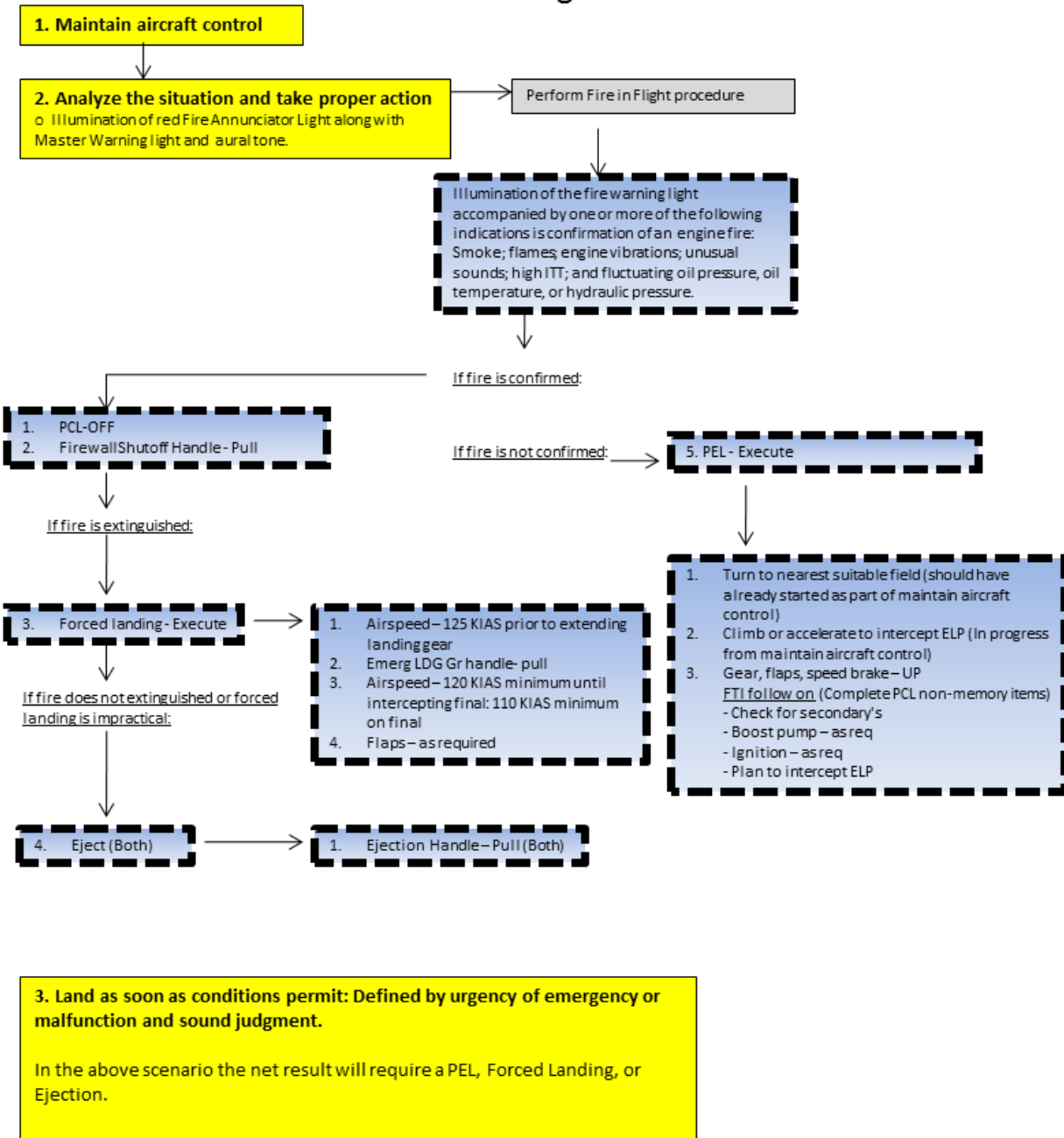
Engine failure during flight (Flameout)



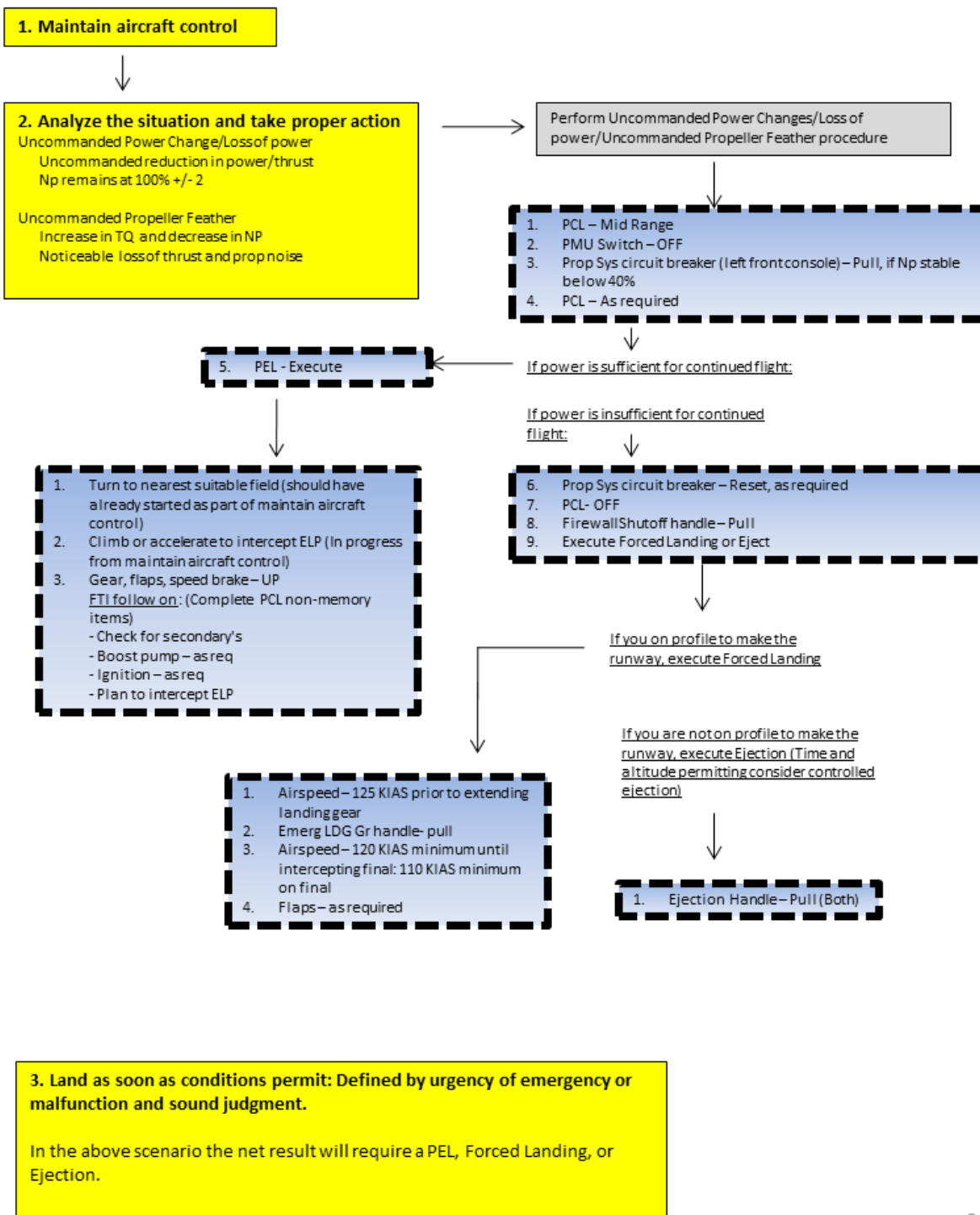
Engine failure during flight (Seizure)



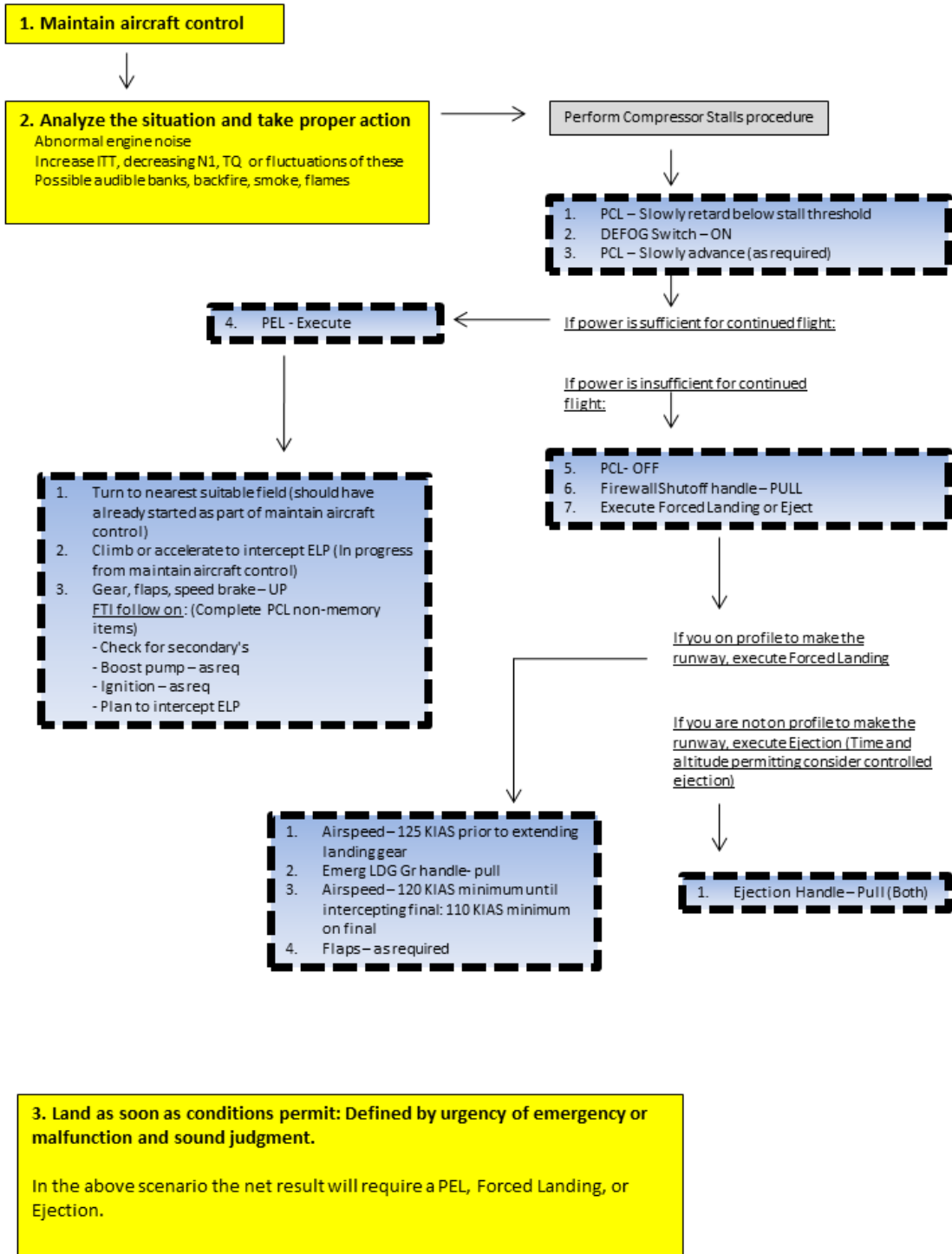
Fire in flight



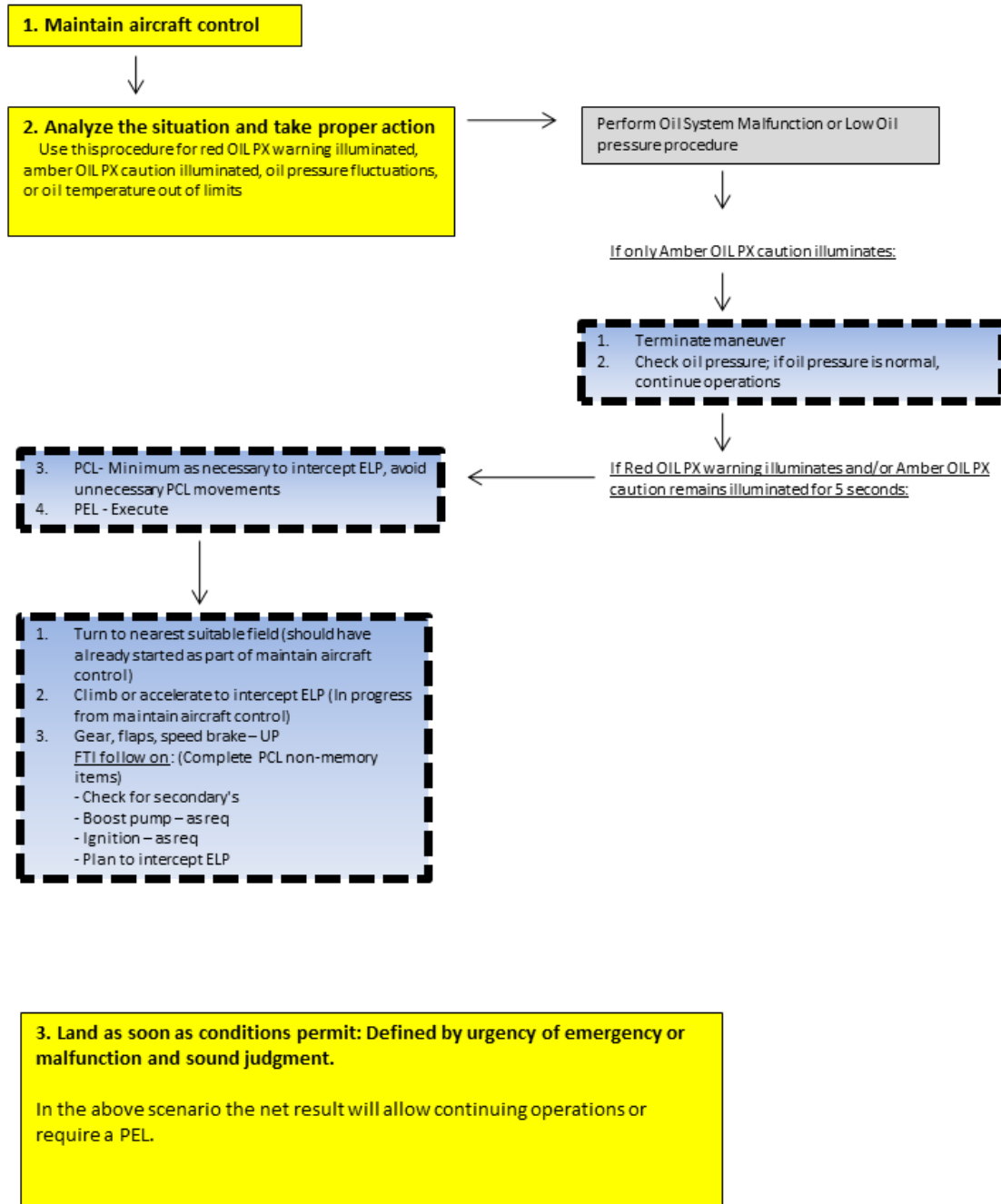
Uncommanded Power Changes/Loss of power/Uncommanded Propeller Feather



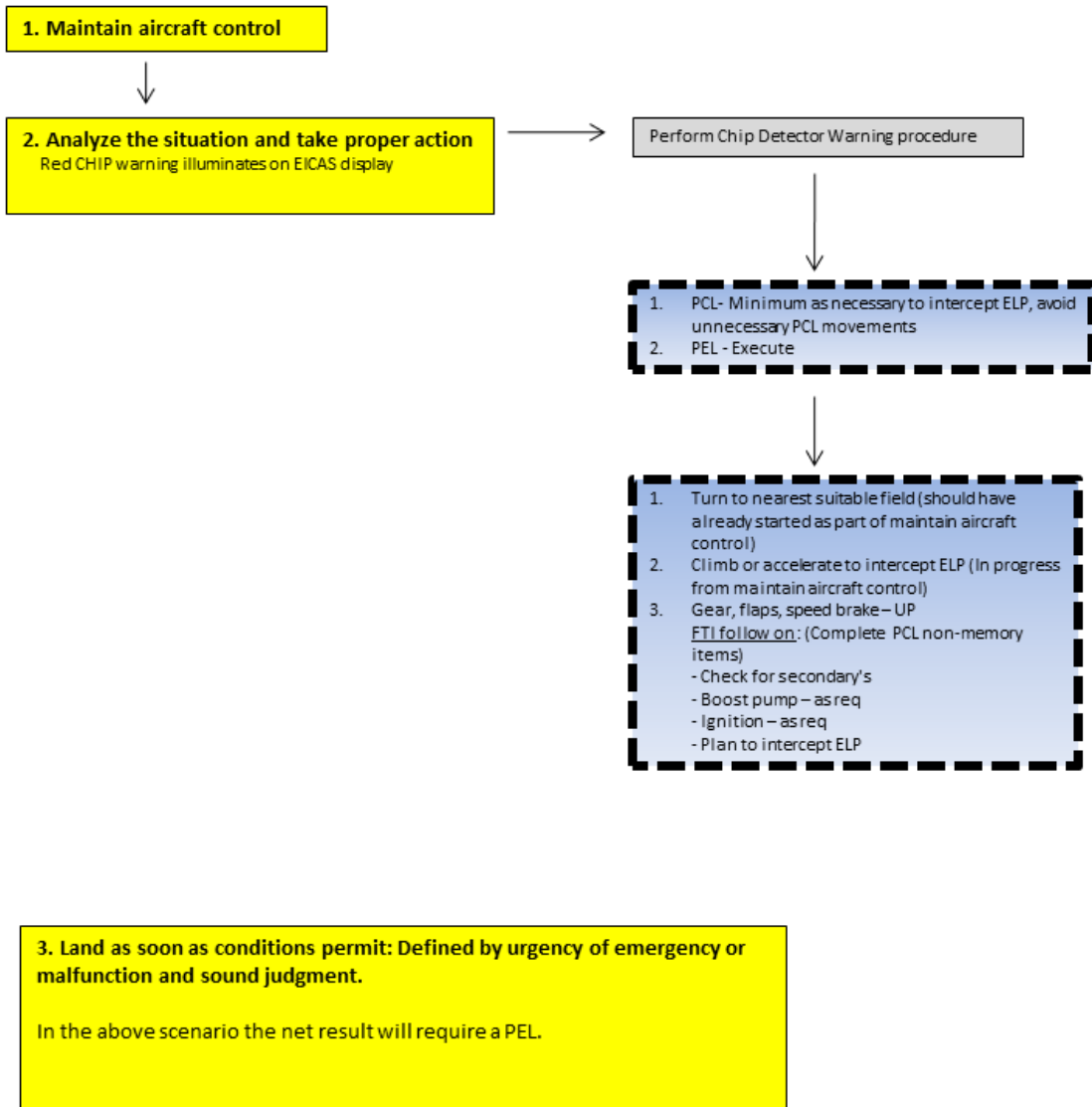
Compressor Stalls



Oil System Malfunction or Low Oil Pressure

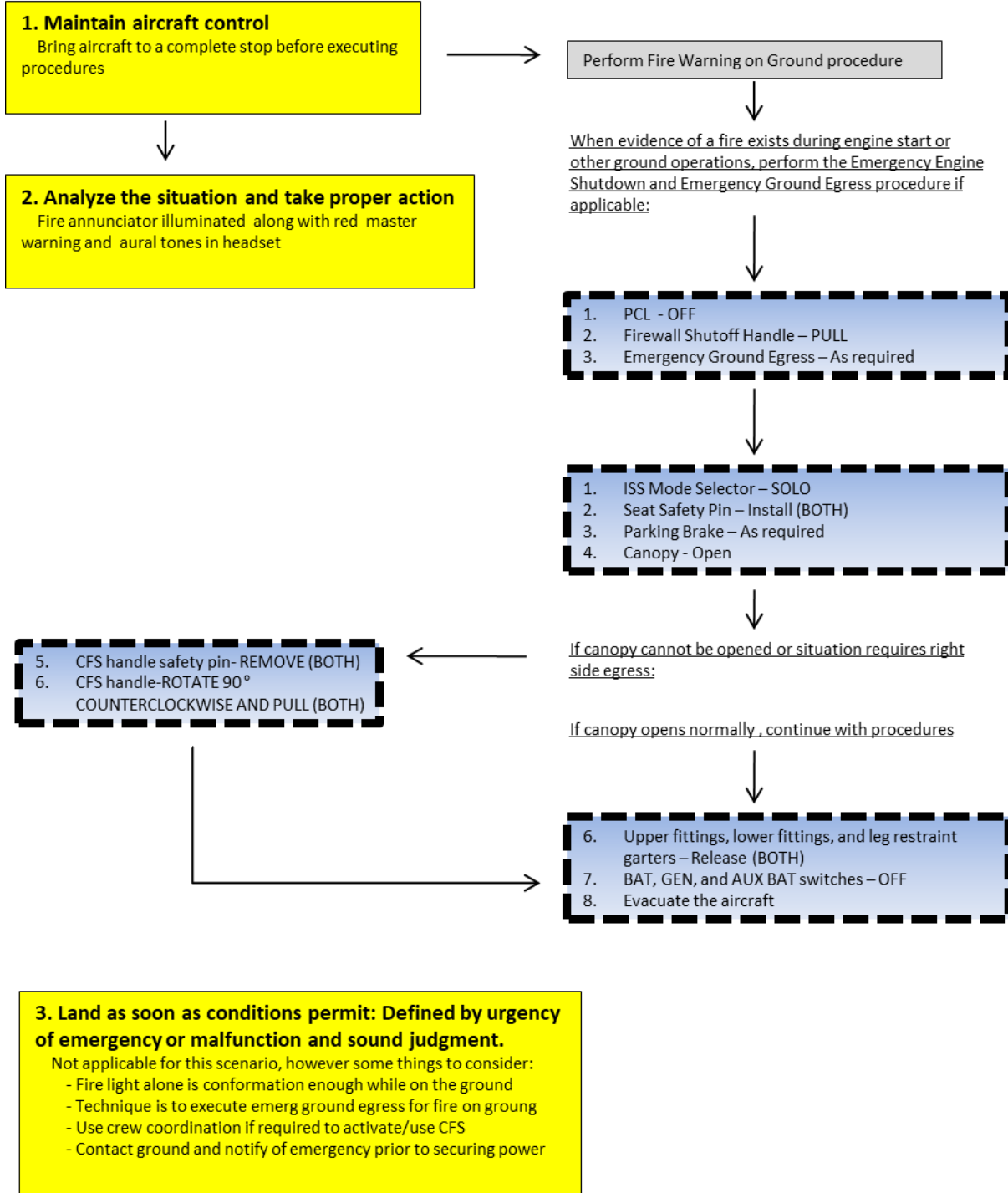


Chip Detector Warning



Fire Warning on Ground

(scenario: aircraft is taxiing to ground run-up area when emergency occurs)



Key points of interest

- Zoom Glide: Above 150 KIAS, 2G pull up to 20° climb angle, 20 knot lead with 0 to +0.5G pushover. Below 150 KIAS, perform constant deceleration to glide speed.
- Crosscheck N1 against other engine indications to assess condition of engine and determine if an airstart is warranted. At 125 KIAS an engine which has flamed out will rotate below 8% N1 and indicate 0% N1. The engine oil pressure indicator may display oil pressures up to 4 psi with N1 of 0%.
- Propeller will not feather unless PCL is fully OFF.
- Airstart procedure is not recommended below 2000 feet AGL, as primary attention should be to eject or safely recover the aircraft.
- Do not delay decision to eject below 2000 feet AGL.
- PCL must be OFF to feather the propeller, and ensure proper starter, ignition, boost pump, and PMU operation during airstart.
- If N1 does not rise within 5 seconds, discontinue the airstart.
- Movement of the PCL above IDLE before N1 stabilizes at approximately 67% will cause an increase in fuel flow which may cause engine failure due to severe ITT overtemperature.
- If there is no rise in ITT within 10 seconds of fuel flow indications, place the PCL to OFF and abort the start.
- Typically in excess of 1200 feet will be lost for each airstart attempt. Propeller will unfeather and accelerate to operating RPM approximately 20 seconds after N1 reaches 45%. Useful power will be available after 40 seconds from starter engagement.
- If rate of descent (indicated on the VSI while stabilized at 125 KIAS with gear, flaps, and speed brake retracted and 4 to 6% torque) is greater than 1500 ft/min, increase torque as necessary (up to 131%) to achieve approximately 1350 to 1500 ft/min rate of descent. If engine power is insufficient to produce a rate of descent less than 1500 ft/min, set PCL to OFF.
- With PROP SYS circuit breaker pulled and the PMU switch is OFF, the feather dump solenoid will not be powered. The propeller will feather at a slower rate as oil pressure decreases and the feathering spring takes effect. Glide performance will be considerably reduced and it may not be possible to intercept or fly the emergency landing pattern.
- If the engine should fail while flying the PEL, refer to Engine Failure During Flight Checklist and transition to the Forced Landing Procedure.
- Once on PEL profile, if engine is vibrating excessively, or if indications of failure are imminent, set PCL to OFF.